

## IN THE CLAIMS

Cancel Claims 6, 8, and 14.

Amend Claims 1 and 7.

1. (currently amended) A magnetoresistive sensor comprising:  
a magnetoresistive free layer;  
a first ferromagnetic bias layer providing a first bias to the free layer;  
a second ferromagnetic bias layer providing a second bias to the free layer; and  
a decoupling layer disposed between the first and second bias layers to substantially eliminate exchange coupling between the first and second bias layers[.]; and  
the first bias layer includes a first plurality of crystal grains and the second bias layer includes a second plurality of crystal grains substantially uncorrelated with the first plurality.
2. (original) The sensor of claim 1, wherein said first bias layer has a coercivity  $H_{c1}$  and said second bias layer has a coercivity  $H_{c2}$  greater than  $H_{c1}$ .
3. (original) The sensor of claim 2, wherein said first and second bias layers comprise first and second materials respectively, and wherein said first and second materials differ.
4. (original) The sensor of claim 2, wherein said first and second bias layers comprise first and second materials respectively, and wherein said first and second materials are the same.
5. (original) The sensor of claim 2, wherein said first and second biases are independently adjustable by application of an external magnetic field.

6. (canceled)

7. (currently amended) The sensor of claim 1, wherein said second bias layer is deposited on top of said ~~decoupling~~ decoupling layer, and wherein an easy magnetization direction of said second bias layer is constrained, by said decoupling layer, to be parallel to an interface between said decoupling layer and said second bias layer.

8. (canceled)

9. (original) The sensor of claim 1, wherein said decoupling layer comprises a bcc metal.

10. (original) The sensor of claim 1, wherein said decoupling layer comprises of fcc metal.

11. (original) The sensor of claim 1, wherein said decoupling layer comprises a CrX alloy, where X is Mo, Mn, Co, Ti, Ta, V, Zr, or Nb.

12. (original) The sensor of claim 1, wherein said first bias layer comprises a first binary, ternary or quaternary alloy of Co, and wherein said second bias layer comprises a second binary, ternary or quaternary alloy of Co.

13. (original) The sensor of claim 12, wherein said first alloy comprises  $\text{Co}_x\text{Pt}_{1-x}$  where  $0.5 < x < 1$ , and wherein said second alloy comprises  $\text{Co}_y\text{Pt}_{1-y}$  where  $0.5 < y < 1$ .

14. (canceled)

Add the following new claims:

15. (new) A magnetoresistive sensor comprising:
  - a magnetoresistive free layer;
  - a first ferromagnetic bias layer providing a first bias to the free layer;
  - a second ferromagnetic bias layer providing a second bias to the free layer; and
  - a decoupling layer disposed between the first and second bias layers to substantially eliminate exchange coupling between the first and second bias layers; and

the second bias layer is deposited on top of the decoupling layer, and an easy magnetization direction of the second bias layer is constrained, by the decoupling layer, to be parallel to an interface between the decoupling layer and the second bias layer.
16. (new) The sensor of claim 15, wherein the first bias layer has a coercivity  $H_{c1}$  and the second bias layer has a coercivity  $H_{c2}$  greater than  $H_{c1}$ .
17. (new) The sensor of claim 16, wherein the first and second bias layers comprise first and second materials respectively, and wherein the first and second materials differ.
18. (new) The sensor of claim 16, wherein the first and second bias layers comprise first and second materials respectively, and wherein the first and second materials are the same.
19. (new) The sensor of claim 16, wherein the first and second biases are independently adjustable by application of an external magnetic field.

20. (new) The sensor of claim 15, wherein the decoupling layer comprises one of a bcc metal and an fcc metal.

21. (new) The sensor of claim 15, wherein the decoupling layer comprises a CrX alloy, where X is Mo, Mn, Co, Ti, Ta, V, Zr, or Nb.

22. (new) The sensor of claim 15, wherein the first bias layer comprises a first binary, ternary or quaternary alloy of Co, and wherein the second bias layer comprises a second binary, ternary or quaternary alloy of Co.

23. (new) The sensor of claim 22, wherein the first alloy comprises  $\text{Co}_x\text{Pt}_{1-x}$  where  $0.5 < x < 1$ , and wherein the second alloy comprises  $\text{Co}_y\text{Pt}_{1-y}$  where  $0.5 < y < 1$ .